

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

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IMPORTANT NOTIFICATION

International application No.
PCT/EP 03/50353

International filing date (day/month/year)
31.07.2003

Priority date (day/month/year)
05.08.2002

Applicant
G.D SOCIETA PER AZIONI et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)



Applicant's or agent's file reference E1772-03	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/50353	International filing date (day/month/year) 31.07.2003	Priority date (day/month/year) 05.08.2002
International Patent Classification (IPC) or both national classification and IPC B65B5/02		
Applicant G.D SOCIETA PER AZIONI et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 12 sheets.

3. This report contains indications relating to the following items:
 - ☒ Basis of the opinion
 - ☐ Priority
 - ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - ☐ Lack of unity of invention
 - ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - ☐ Certain documents cited
 - ☐ Certain defects in the international application
 - ☐ Certain observations on the international application

Date of submission of the demand 05.03.2004	Date of completion of this report 17.06.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Hillebrand, A Telephone No. +49 89 2399-2642 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/50353**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

4-13 as originally filed
1-3 received on 25.03.2004 with letter of 19.03.2004

Claims, Numbers

1-30 received on 25.03.2004 with letter of 19.03.2004

Drawings, Sheets

1-2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/50353**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-30
	No: Claims	--
Inventive step (IS)	Yes: Claims	1-30
	No: Claims	--
Industrial applicability (IA)	Yes: Claims	1-30
	No: Claims	--

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The document D1: WO 89 00132 A is regarded as being the closest prior art to the subject-matter claimed. D1 describes, within other things, a mechanism for unfolding flat cardboard boxes. The core parts of said mechanism are two holding arms hinged to each other. They engage adjacent walls of the flat package by suction cups and open the package in an swinging rotational movement. The swivelling axes of the two holding arms and the two package walls are not coincident. For more details see D1 fig.1 particularly ref. 30 and 40 and corresponding portions of the description.

The claimed method and the corresponding apparatus differ from D1 in that the suction cups at one of the holding arms are slidably mounted and thus compensate the relative movement between suction cups and package wall induced by the difference between the said swivelling axes.

The rest of the available prior art documents does not suggest any compensation of different swivelling axes and thus leads away from the solution found.

Re Item VII

Certain defects

The modified description still refers to embodiments without slidable suction cups (see e.g. p.6 l.18... and p.10 l.15...).

5

METHOD AND MACHINE FOR PACKING A PRODUCT IN A FLAT
TUBULAR PACKAGE

10

TECHNICAL FIELD

The present invention relates to a method of packing a product in a flat tubular package.

The present invention may be used to advantage on a cigarette carton boxing machine, i.e. a machine for
15 packing groups of cartons of cigarettes in respective boxes, to which the following description refers purely by way of example.

BACKGROUND ART

Machines for boxing cartons of cigarettes currently
20 comprise a unit for supplying and opening flat tubular packages, and which receives a stack of flat tubular packages on a pallet, and feeds each flat tubular package to a respective seat on a conveyor, which feeds the tubular package along a straight packing path. Along the
25 packing path, each tubular package remains connected to the respective seat, and is fed through an opening station, where the tubular package is opened into a configuration suitable for receiving a respective group

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of cartons of cigarettes; through an insertion station, where a respective group of cartons of cigarettes is pushed inside the open tubular package; and, finally, through a sealing station, where the tubular package is sealed by gumming and folding the relative flaps.

Known boxing machines of the above type are fairly bulky, and, for use on the machine, require accurate positioning of the stack of flat tubular packages, and therefore periodic assistance on the part of the operator.

DISCLOSURE OF INVENTION

It is an object of the present invention to provide a method of packing a product in a flat tubular package, designed to eliminate the aforementioned drawbacks, and which, in particular, is straightforward and cheap to implement.

According to the present invention, there is provided a method of packing a product in a flat tubular package having two first lateral walls; and two second lateral walls, each connected on one side to one first lateral wall, and on the other side to the other first lateral wall, by respective preformed fold lines; the method comprising engaging a first lateral wall of the flat tubular package and a second lateral wall of the flat tubular package by means of a first portion and a second portion respectively of a suction gripping head; and the method being characterized by comprising the steps of generating a rotational movement between the

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first and second portion of the suction gripping head, to rotate the first and second lateral wall engaged by the suction gripping head with respect to each other, and so convert the flat tubular package from the flat configuration to an open configuration; and inserting the product inside the open tubular package.

The present invention also relates to a machine for packing a product in a flat tubular package.

According to the present invention, there is provided a machine for packing a product in a flat tubular package having two first lateral walls; and two second lateral walls, each connected on one side to one first lateral wall, and on the other side to the other first lateral wall, by respective preformed fold lines; the machine comprising a suction gripping head having a first and a second portion; and an actuating device for causing the first portion and the second portion of the suction gripping head to engage a first lateral wall of the flat tubular package and a second lateral wall of the flat tubular package respectively; and the machine being characterized by comprising actuating means for generating a rotational movement between the first and second portion of the suction gripping head, to rotate the first and second lateral wall engaged by the suction gripping head with respect to each other, and so convert the flat tubular package from the flat configuration to an open configuration; and an insertion device for inserting the product inside the open tubular package.

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CLAIMS

1) A method of packing a product (2) in a flat tubular package (3) having two first lateral walls (4);
5 and two second lateral walls (5), each connected on one side to one first lateral wall (4), and on the other side to the other first lateral wall (4), by respective preformed fold lines (6); the method comprising engaging a first lateral wall (4) of the flat tubular package (3)
10 and a second lateral wall (5) of the flat tubular package (3) by means of a first portion (30) and a second portion (31) respectively of a first suction gripping head (14); and the method being characterized by comprising the steps of generating a rotational movement between the
15 first (30) and second (31) portion of the first suction gripping head (14), to rotate the first and second lateral wall (4, 5) engaged by the first suction gripping head (14) with respect to each other, and so convert the flat tubular package (3) from the flat configuration to
20 an open configuration; and inserting the product (2) inside the open tubular package (3).

2) A method as claimed in Claim 1, characterized in that the flat tubular package (3) is engaged by the first suction gripping head (14) at a pickup station (11), and
25 is transferred, attached to the first suction gripping head (14), to a receiving station (17) where the product (2) is inserted inside the open tubular package (3); the flat tubular package (3) being converted from the flat

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configuration to the open configuration during transfer from the pickup station (11) to the receiving station (17).

3) A method as claimed in Claim 2, characterized in that, following insertion of the product (2) inside the open tubular package (3), the first suction gripping head (14) engaging the open tubular package (3) is moved to feed the open tubular package (3) to a sealing station (16) where the open tubular package (3) is sealed.

4) A method as claimed in Claim 3, characterized in that the first suction gripping head (14) transfers the open tubular package (3) to conveying means (40, 46) located at the sealing station (16) and for feeding the open tubular package (3) through the sealing station (16) and to an output station.

5) A method as claimed in Claim 2, characterized in that, following insertion of the product (2) inside the open tubular package (3), the open tubular package (3) is sealed at the receiving station (17), and the first suction gripping head (14) engaging the sealed tubular package (3) is moved to feed the sealed tubular package (3) to an output station.

6) A method as claimed in one of Claims 3 to 5, characterized in that the open tubular package (3) is sealed by folding, one on top of another, flaps (7, 8) projecting from the first and second lateral walls (4, 5), and by applying respective lengths (10) of adhesive tape to the folded flaps (7, 8).

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7) A method as claimed in one of Claims 1 to 5, characterized in that the flat tubular package (3) is picked up by the first suction gripping head (14) off a stack (13) of flat tubular packages (3).

5 8) A method as claimed in Claim 7, characterized in that, before engaging the top flat tubular package (3) in the stack (13), the first suction gripping head (14) determines the exact position of the flat tubular package (3), and adapts its own position accordingly, so as to
10 engage the flat tubular package (3) in accordance with a given mutual arrangement.

9) A method as claimed in Claim 8, characterized in that the first suction gripping head (14) is movable with four degrees of freedom comprising three translatory
15 movements in three perpendicular directions (18, 19, 20), and one rotational movement about an axis (21) perpendicular to the plane of the flat tubular package (3).

10) A method as claimed in one of Claims 1 to 9,
20 characterized in that the rotational movement between the first (30) and second (31) portion of the first suction gripping head (14) is made about an axis (32) of rotation substantially coincident with the fold line (6) between the first and second lateral wall (4, 5) engaged by the
25 first suction gripping head (14).

11) A method as claimed in one of Claims 1 to 9, characterized in that the rotational movement between the first (30) and second (31) portion of the first suction

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gripping head (14) is made about an axis (32) of rotation not coincident with the fold line (6) between the first and second lateral wall (4, 5) engaged by the first suction gripping head (14); suction cups (34) on the second portion (31) moving in a direction perpendicular to the axis (32) of rotation during the rotational movement between the first (30) and second (31) portion of the first suction gripping head (14).

12) A method as claimed in one of Claims 1 to 11, characterized by engaging a first lateral wall (4) of the flat tubular package (3) and a second lateral wall (5) of the flat tubular package (3) by means of the first portion (30) and second portion (31) respectively of the first suction gripping head (14), and by also engaging, by means of a second suction gripping head (47), the first lateral wall (4) of the flat tubular package (3) opposite the first lateral wall (4) engaged by the first suction gripping head (14); the flat tubular package (3) being converted from the flat configuration to the open configuration by the rotational movement between the first (30) and second (31) portion of the first suction gripping head (14), and also by a relative rotational movement between the first suction gripping head (14) and the second suction gripping head (47).

13) A method as claimed in Claim 12, characterized in that, once the flat tubular package (3) is converted to the open configuration, the second suction gripping head (47) releases the first lateral wall (4) of the open

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tubular package (3).

14) A method as claimed in Claim 12 or 13, characterized in that the second suction gripping head (47) is rotated about a vertical axis (50) between a rest position allowing free vertical movement of the first suction gripping head (14), and a work position wherein the second suction gripping head (47) engages the flat tubular package (3).

15) A method as claimed in Claim 12, 13 or 14, characterized in that the relative rotational movement between the first suction gripping head (14) and the second suction gripping head (47) is made by keeping the second suction gripping head (47) stationary, and moving the first suction gripping head (14).

16) A method as claimed in one of Claims 1 to 15, characterized in the product (2) is defined by a group (2) of cartons of cigarettes.

17) A machine for packing a product (2) in a flat tubular package (3) having two first lateral walls (4); and two second lateral walls (5), each connected on one side to one first lateral wall (4), and on the other side to the other first lateral wall (4), by respective preformed fold lines (6); the machine (1) comprising a first suction gripping head (14) having a first (30) and a second (31) portion; and a first actuating device (15) for causing the first portion (30) and the second portion (31) of the first suction gripping head (14) to engage a first lateral wall (4) of the flat tubular package (3)

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and a second lateral wall (5) of the flat tubular package (3) respectively; and the machine (1) being characterized by comprising actuating means (33) for generating a rotational movement between the first (30) and second
5 (31) portion of the first suction gripping head (14), to rotate the first and second lateral wall (4, 5) engaged by the first suction gripping head (14) with respect to each other, and so convert the flat tubular package (3) from the flat configuration to an open configuration; and
10 an insertion device (36) for inserting the product (2) inside the open tubular package (3).

18) A machine as claimed in Claim 17, characterized by comprising a pickup station (11), where the flat tubular package (3) is engaged by the first suction
15 gripping head (14), and a receiving station (17); the first actuating device (15) moving the first suction gripping head (14), attached to the flat tubular package (3), from the pickup station (11) to the receiving station (17); and the actuating means (33) generating a
20 rotational movement between the first (30) and second (31) portion of the first suction gripping head (14) as the first suction gripping head (14) is moved from the pickup station (11) to the receiving station (17).

19) A machine as claimed in Claim 18, characterized
25 in that the pickup station (11) houses at least one stack (13) of flat tubular packages (3), which are engaged successively by the first suction gripping head (14).

20) A machine as claimed in Claim 19, characterized

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in that the first suction gripping head (14) comprises a sensor (35) for determining the exact position of the top flat tubular package (3) in the stack (13) before the flat tubular package (3) is engaged; a control unit being
5 provided to control the first actuating device (15) supporting the first suction gripping head (14), so as to adapt the position of the first suction gripping head (14) to the exact position of the flat tubular package (3), and engage the flat tubular package (3) in
10 accordance with a given mutual arrangement.

21) A machine as claimed in Claim 20, characterized in that the first actuating device (15) moves the first suction gripping head (14) with four degrees of freedom comprising three translatory movements in three
15 perpendicular directions (18, 19, 20), and one rotational movement about an axis (21) perpendicular to the plane of the flat tubular package (3).

22) A machine as claimed in one of Claims 18 to 21, characterized by comprising an output station; and
20 conveying means (40, 46) for receiving the open tubular package (3) containing the product (2) from the first suction gripping head (14), and for feeding the open tubular package (3) containing the product (2) to the output station.

25 23) A machine as claimed in Claim 22, characterized by comprising sealing means (45) for sealing the open tubular package (3) containing the product (2).

24) A machine as claimed in Claim 23, characterized

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in that the sealing means (45) are connected to the conveying means (40, 46).

25) A machine as claimed in Claim 24, characterized in that the sealing means (45) are located at the receiving station (17).

26) A machine as claimed in one of Claims 22 to 25, characterized in that said conveying means (40, 46) comprise a first belt conveyor (40) hinged to rotate about a horizontal axis (44) between a horizontal position, in which the first conveyor (40) feeds the open tubular package (3) containing the product (2) along a horizontal path, and a vertical position, in which the first conveyor (40) feeds the open tubular package (3) along a vertical path.

27) A machine as claimed in Claim 26, characterized in that said conveying means (40, 46) comprise a second belt conveyor (46) aligned with the first belt conveyor (40) when the first belt conveyor (40) is in said vertical position.

28) A machine as claimed in one of Claims 17 to 27, characterized in that the insertion device (36) comprises a conveyor (37) for feeding the product (2) into alignment with the open tubular package (3); and a pusher (38) for pushing the product (2) inside the open tubular package (3).

29) A machine as claimed in Claim 28, characterized in that the insertion device (36) comprises fixed sections (39) for assisting insertion of the product (2)

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inside the open tubular package (3).

30) A machine as claimed in one of Claims 17 to 29, characterized in that the first (30) and second (31) portion of the first suction gripping head (14) are
5 hinged and rotated by the actuating means (33) about an axis (32) of rotation substantially coincident with the fold line (6) between the first and second lateral wall (4, 5) engaged by the first suction gripping head (14).

31) A machine as claimed in one of Claims 17 to 29,
10 characterized in that the first (30) and second (31) portion of the first suction gripping head (14) are hinged and rotated by the actuating means (33) about an axis (32) of rotation not coincident with the fold line (6) between the first and second lateral wall (4, 5)
15 engaged by the first suction gripping head (14); the first (30) and second (31) portion of the first suction gripping head (14) comprising respective suction cups (34); and the suction cups (34) of the second portion (31) being fitted to the second portion (31) to move in a
20 direction perpendicular to the axis (32) of rotation during the rotational movement between the first (30) and second (31) portion of the first suction gripping head (14).

32) A machine as claimed in one of Claims 17 to 31,
25 characterized by comprising a second suction gripping head (47), and a second actuating device (49) for causing the second suction gripping head (47) to engage the first lateral wall (4) of the flat tubular package (3) opposite

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the first lateral wall (4) engaged by the first suction gripping head (14); the flat tubular package (3) being converted from the flat configuration to the open configuration by the rotational movement between the first (30) and second (31) portion of the first suction gripping head (14), and also by a relative rotational movement between the first suction gripping head (14) and the second suction gripping head (47).

33) A machine as claimed in Claim 32, characterized in that the second actuating device (49) rotates the second suction gripping head (47) about a vertical axis (50) between a rest position permitting free vertical movement of the first suction gripping head (14), and a work position, in which the second suction gripping head (47) engages the flat tubular package (3).

34) A machine as claimed in Claim 32 or 33, characterized in that the relative rotational movement between the first suction gripping head (14) and the second suction gripping head (47) is generated solely by the first actuating device (15).

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